

Appl. No. 10/752,870
Response Date: September 15, 2006
Reply to Office Action of June 15, 2006

• • R E M A R K S / A R G U M E N T S • •

The Official Action of June 15, 2006 has been thoroughly studied. Accordingly, the changes presented herein for the application, considered together with the following remarks, are believed to be sufficient to place the application into condition for allowance.

By the present amendment claims 5, 14, 20 and 23 have been canceled and the limitations of these claims have been incorporated into independent claim 1. In addition, claims 8, 11 and 17 have been changed to limit the claimed invention to a cross-linked product of the fluoroelastomer composition.

Finally new claim 26 has been added which recites a cross-linked product containing an uncross-linked liquid fluoroelastomer obtained by cross-linking the fluoroelastomer composition..

Entry of the changes to the claims is respectfully requested.

Claims 1-4, 6-13, 15-19, 21, 22 and 24-26 remain pending in this application.

Claims 3, 4, 6, 7, 9, 10, 12, 13, 15, 16, 18, 19, 21, 22, 24 and 25 stand withdrawn as being directed to a non-elected invention.

Claims 1, 2, 5, 8, 11, 14, 17, 20 and 23 stand rejected under 35 U.S.C. §102(e) as being anticipated by or, in the alternative, under 35 U.S.C. §103(a) as being obvious over U.S. Patent Application Publication No. 2004/0048983 to Hochgesang et al.

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Claims 1, 2, 5, 8, 11, 14, 17, 20 and 23 stand rejected under 35 U.S.C. §103(a) as being obvious over U.S. Patent No. 3,573,976 to Duane in view of Hochgesang et al.

For the reasons set forth below, it is submitted that all of the pending claims are allowable over the prior art of record and therefore, the outstanding prior art rejections of the claims should properly be withdrawn.

Favorable reconsideration by the Examiner is earnestly solicited.

The Examiner has relied upon Hochgesang et al. as disclosing:

...that **a fluoroelastomer composition** may comprise two different sub-components as follows: one is a peroxide-curable **solid fluoroelastomer** along with a peroxide curative agent, and the other one is a bisphenol-curable **"liquid" fluoroelastomer** along with a bisphenol curative agent (abstract, line 1-5; see paragraphs 22 and 23 for solid fluoroelastomer, particularly see using the claimed **terpolymer of TFE (1-96 wt%)/VDF (2-97 wt%)/PMVE (1-96 wt%)**; see paragraphs 28-31 for the use of liquid fluoroelastomer). It is noted that weight ratio of Hochgesang's terpolymer TFE/VDF/PMVE is indeed reading on molar ratio of Applicant's terpolymer VdF/FMVE/TFE on page 4 at lines 7-9 after conversion of unit.

The Examiner will note that Hochgesang et al. teaches separate curative agents for each of the solid fluoroelastomer component and for the liquid fluoroelastomer component.

Accordingly it is clear that Hochgesang et al. cures or cross-links each of the solid and liquid fluoroelastomer components.

In particular, Hochgesang et al. teaches the use of a bisphenol curing agent for the liquid fluoroelastomer component.

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As the Examiner will note from reviewing applicants' disclosure, applicants' invention involves preparing the terpolymer so as to have cross-linking sites (see pages 2-3) for organic peroxide cross-linking.

In applicants' invention the liquid fluoroelastomer component is not cross-linked as in the case of Hochgesang et al.

The use of a bisphenol curative agent (which is taught by Hochgesang et al.) for curing bisphenol-curable liquid fluoroelastomers causes generation of hydrogen fluoride (HF) gas during the curing process.

Therefore, the use of a bisphenol curative agent for curing bisphenol-curable liquid fluoroelastomers is extremely undesirable for compositions that are used to mold materials such as fuel cell stack gaskets or hard disc driving gaskets.

Accordingly, polyol curative agents are not used in applicants' invention.

More specifically, the liquid fluoroelastomer component in applicants' invention is not cross-linked (by the peroxide used to cure the terpolymer) and is therefore only present as a plasticizer.

This is a major difference between the present invention and Hochgesang et al.

In applicants' invention, the liquid fluoroelastomer is only present in an uncured state in the cured (terpolymer) product.

Accordingly, the minimum viscosity of the compounded liquid fluoroelastomer is limited to 500 cps at 100°C.

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Moreover, since the liquid fluoroelastomer is not cured in the cured (terpolymer) product, its compounded viscosity is unchanged so that it functions as a plasticizer as noted above.

The differences between Hochgesang et al. and the present invention can be appreciated by noting that Hochgesang et al. is concerned with improving the flowability of the fluoroelastomer compositions at room temperature and the fluid resistance and sealability over a wide temperature range (see abstract). Therefore, Hochgesang et al. as determined to provide a "mixed cure system" that includes curative agents for each of the peroxide-curative solid fluoroelastomer component and the bisphenol-curable liquid fluoroelastomer component.

Hochgesang et al. apparently has little concern for the generation of HF because this reference teaches "formed-in-place" gaskets and gaskets that can be "printed" onto the surfaces of articles (see paragraphs [0147] –[0149]).

The physical differences between Hochgesang et al. and the present invention allow the fluoroelastomer compositions of the present invention to be particularly suitable for used as fuel cell gaskets or hard disc driving gaskets. Such applications involve materials having relatively weak strengths or stiffnesses (e.g. carbon or SUS thin plates) between which the gaskets need to be compressed. Accordingly, a gasket or molding material having a low hardness, e.g. lower than 50 as set forth in applicants' claim 8 is required.

Hochgesang et al. does not teach such a property or any motivation for such a property.

Further, in order to provide a gasket having a long-life static sealability, the value of the compression set (CS) needs to be low. However, CS is general deteriorates as a rubber

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composition's hardness increases. Accordingly, it is important to provide an excellent CS together with a low hardness. Accordingly, as set forth in claim 11, applicants' fluoroelastomer composition has a CS of not more than 50%.

Hochgesang et al. does not teach such a property or any motivation for such a property.

Low temperature characteristics are also important and especially for automotive fuel cell applications. In cold regions, the ambient temperatures can fall as low as -30°C. In such conditions, hydrogen gas produced by the fuel cell systems, need to be effectively sealed. Therefore, low temperature characteristics are very important. Accordingly, as set forth in claim 17 applicants' fluoroelastomer compositions have a low temperature characteristic of not more than -25°C in terms of TR10 value.

Hochgesang et al. does not teach such a property or any motivation for such a property.

It is accordingly submitted that Hochgesang et al. neither anticipates nor renders applicants' claimed invention obvious.

The Examiner has relied upon Duane as disclosing a method of making coaxial cable which involves the use of a non-fluorinated composition of a solid polyethylene and a liquid polymeric hydrocarbon.

In combining the teachings of Duane and Hochgesang et al. the Examiner takes the position that:

...one having ordinary skill in the art would have found it obvious to modify Duane's fluorinated composition by replacing solid fluoropolymer such as polytetrafluoroethylene (PTFE) with other TFE-containing fluoropolymers such as

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terpolymer TFE/VDE/PMVE as taught by Hochgesang based on functional equivalence and interexchangeability.

The Examiner's reliance upon Duane does not overcome or address the differences between Hochgesang et al. and the present invention as discussed above.

Accordingly, the combination of Duane and Hochgesang et al. does not render applicants' claimed invention obvious.

Based upon the above distinctions between the prior art relied upon by the Examiner and the present invention, and the overall teachings of prior art, properly considered as a whole, it is respectfully submitted that the Examiner cannot rely upon the prior art as required under 35 U.S.C. §102 as anticipating applicants' claimed invention.

Moreover, the Examiner cannot rely upon the prior art as required under 35 U.S.C. §103 to establish a prima facie case of obviousness of applicants' claimed invention.

It is, therefore, submitted that any reliance upon prior art would be improper inasmuch as the prior art does not remotely anticipate, teach, suggest or render obvious the present invention.

It is submitted that the claims, as now amended, and the discussion contained herein clearly show that the claimed invention is novel and neither anticipated nor obvious over the teachings of the prior art and the outstanding rejections of the claims should hence be withdrawn.

Therefore, reconsideration and withdrawal of the outstanding rejections of the claims and an early allowance of the claims is believed to be in order.

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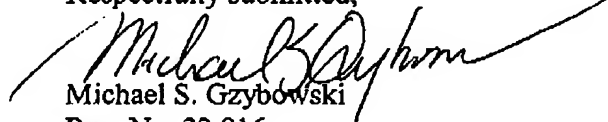
It is believed that the above represents a complete response to the Official Action and reconsideration is requested.

The prior art made of record on page 8 of the Office Action, but not relied upon by the Examiner has been noted. This prior art is not deemed to be particularly pertinent to applicants' claimed invention.

If upon consideration of the above, the Examiner should feel that there remain outstanding issues in the present application that could be resolved; the Examiner is invited to contact applicants' patent counsel at the telephone number given below to discuss such issues.

To the extent necessary, a petition for an extension of time under 37 CFR §1.136 is hereby made. Please charge the fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 12-2136 and please credit any excess fees to such deposit account.

Respectfully submitted,


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